



FIG. 1

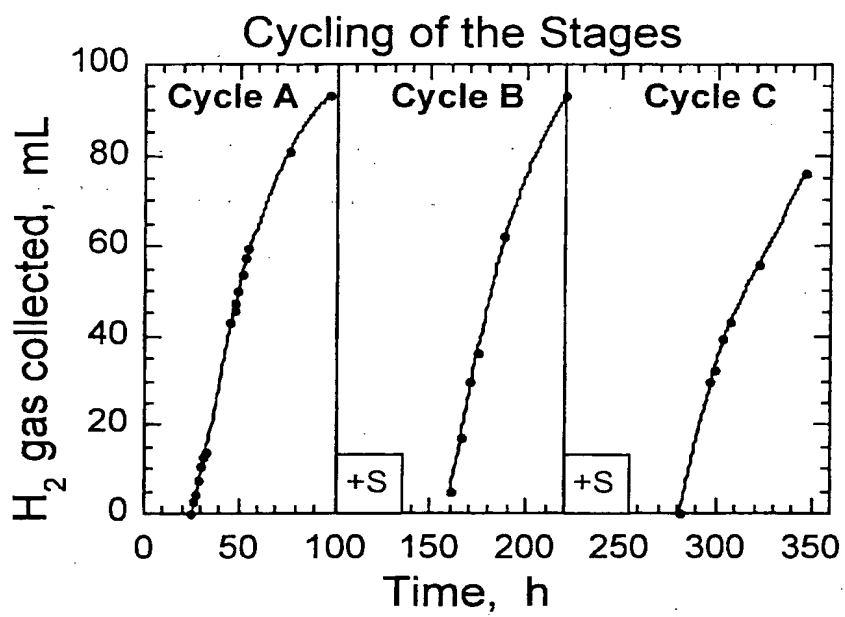


FIG. 2

*Chlamydomonas reinhardtii* chloroplast Sulfate Permease (*SulP*) gene structure

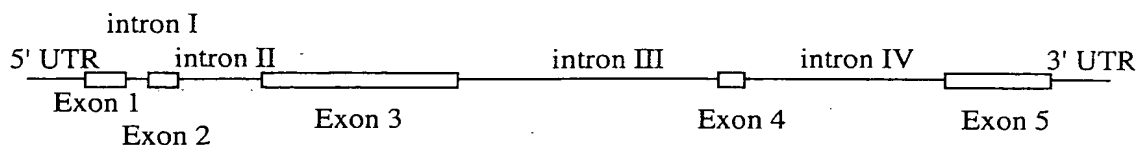


FIG. 3

*reinhardtii* chloroplast Sulfate Permease (*SulP*) amino acid sequence

MERVCSHQLASSRGRPC<sup>1</sup>IAGVQ<sup>2</sup>RSPIRLGTSSVAHVQVSPAGLGRYQ<sup>3</sup>RQRLQVVASAAAA  
AAFDPPGGVSAGFSQPQQQLPQQHPRQPQAVAEVAVAESVSAPASAAPSNDGSPTASMDG  
GPSSGLSAVPAAATATDLFSAAARLRLPNLSPIITWTFMLSYMAFMLIMPITALLQKASL  
VPLNVFIARATEPVAMHAYYVTFSCSLIAAAINC VF<sup>4</sup>GFVLAWVLVRYNFAGKKILDAAVD  
LPFALPTS<sup>5</sup>VAGLTLATVYGDEFFIGQFLQAQGVQVVFTRLGVVIAMIFVSFPFVVRTMQP  
VMQEIQKEMEEAAWSLGASQWRTFTDVVLPPLL<sup>6</sup>PALLTGTALAFSRALGEFGSIVIVSSN  
FAFKDLIAPVLIFQCLEQYDYVGATVIGTVLLLISLVMMLAVNQLQKLARK\* (SEQ ID NO:1)

## FIG. 4A

### Coding sequence of CrpSulP

5' UTR: 173 bp, Exon1: 124 bp, intronI: 77 bp, Exon2: 78 bp,  
intronII: 279 bp Exon3: 620 bp, intronIII: 834 bp,  
Exon4: 87 bp, intronIV: 699 bp, Exon5: 327 bp, 3'UTR: 575 bp

Total length: 3873 bp

```

gcttagtacc taagcaaaaa taccaaagcc ttatcctgag ttgtcaacaa gaactccagc 60
ctgcgacgat gcaaagcctt tcttgagcgg gttgatggac tttgctttgt tatctgtcca 120
gtaagccacc agacactacc aagtagagta atccatttgt ataggtagc aatatggagc 180
gagtttgtag ccatcagctt gcctcgtcgc gagggaggcc atgcatcgct ggggtgcagc 240
ggtcgccccat ccgactaggg acttcaagcg ttgctcatgt gcaggctctc ccggcaggta 300
agcaccgcgc tcggcggcgt gtacacatgg ggccgtcagg ccaactgcgt ttgttggtta 360
tgcaaccgaa acaggccttg ggagatatca acggcaaaga ctgcaagtcg tggcgtctgc 420
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gggttgccct ggaaaccaag cctcgccacg actacctgca acagcattgc ccgcatctcc 540
agccctcac cctcgagtgc ctccgaaga cctctatccc ctgcgcatca ttggttcggg 600
ggcgccgcct gcgggccttg ggcgctggct acgctgaccg cacggcacga cttggcacgg 660
cctggcgcg cctgagcggc cccccccctc ctgatggccc cacgctttgc cgccacgcc 720
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cccacgccaa ccacaggcgg tggcggaggt agctgtcgcc gagtcagtct cggcgccgc 840
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ttagcagctg ggggtccggc agtagttccc gccctagtga ggtcgaaact ataccagaag 1440
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cgggtggggtg ggagggagag ggaggcggtt ggctgggagg gaagggtaa ggggaggga 1560
gatggtagca cggggcggtg gggacgcaga aggatgacag gcggctgcag ggaagggatg 1620
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gaggggctag agaggggcat gcggactcct gctgggattt aggtgcgtgc tcattgagga 1740
gcccttgga ttagcggacg gaaacgtggc cgacggggtc tgccgagcac accaggctag 1800
ctagacgcgc ggttgggcaa cgagcagagc tgctgtgcgg ctatggatgg aaggcgatgc 1860
agcgagcatg tgcagtgaac attggtttga ggacagggga ctccgaggtt gcataggcgg 1920
gccgccactg tctctgccgc tagggtgact agctgcctcg aacctggcgg tggcccata 1980
cccgcatgtg gaggatgctc cacgcgcttc agcttgccat gtctggggtc tgggtctgga 2040
cgcaatcagc gtgtgagggt ccaactctat atggaattat ggataccttc caactaccag 2100
cacgtaggct gccggaacgc ggctgaagcg gctggcctgc cccctcatcc tctcgttccc 2160

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FIG. 4B

```

ctgtttttgt cccctgtcca cccaggtggt gttcacgcgg ctgggtgtgg tgatcgccat 2220
gatcttcgtg tccttccccct tcgtggtgcg caccatgcag cccgtcatgc aggtgagagc 2280
gcccaggagg cggagccatg gcgggttggg gcgggttggg gcgggttggg gcggggcgcg 2340
gatggggcgg cttggggagt aatgtggggc ggatggggtg gcagcctggc agggatatggg 2400
agcgagagga tagcggggac aggggacagg gaagggaagg gaagggaag gatgccctat 2460
gcgagcaaag ggggtatggg aaccggcggt tggggctggg agcgacggga gcagggaggg 2520
agtgcacgga acgggggcaa ggcggacagg gtgaggagg gtgcaggccg gactgggatg 2580
ggtcatgtgt cctggtcggg ggtgtagccg tgggaggcgg gcaggcagcg tgtgttctgg 2640
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cgttggacac gacttcgttg acagatctag ttcattgcac ccgggtcgca ccaagggtgg 2760
cggcgagccc ggcccggcac gtccgagtac cccggagccg taacgcgcga accgccttg 2820
ttgcgcccc tccctgctcc cctgctccgc ataccgtgca ccatgccctc tgccgcccc 2880
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atggtcgctg ggcgcctcgc agtggcgcac cttcacagac gtggtgctgc cgcgcctgct 3060
gcccgcgctg ctgaccggca cggcactggc cttctcgcgc gcgcttggcg agttcggatc 3120
cattgtcatc gtgtcctcca actttgcctt caaggacctg atcgcgcccg tgctgatctt 3180
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cagtcaccag ggagacgtac gagcgcacac agtgattacg gggattgatt aggcggcgaa 3720
ttgacgcaaa tccacggggg ctgtggcttg ggggaggcag ggattgagcg aaggacgcac 3780
tgcaagctca ggcagtcgca tgcccgtacc ctgcttctgg tccagtgtgg agacaagact 3840
ggcaatcgtg gtcctttgca attcatggcg cgc (SEQ ID NO:2)

```

## FIG. 5

Full length cDNA sequence of *CrcpSulP*: 1984 bp

```

gcttagtacc taagcaaaaa taccaaagcc ttatcctgag ttgtcaacaa gaactccagc 60
ctgcgacgat gcaaagcctt tcttgagcgg gttgatggac tttgctttgt tatctgtcca 120
gtaagccacc agacactacc aagtagagta atccatttgt ataggtagagc aatatggagc 180
gagtttgtag ccatcagctt gcctcgtcgc gagggaggcc atgcatcgct ggggtgcage 240
ggtcgccccat ccgactaggg acttcaagcg ttgctcatgt gcaggctctt ccggcaggcc 300
ttgggagata tcaacggcaa agactgcaag tcgtggcgctc tgcagctgcg gcagcggcctt 360
tcgaccctcc tggaggtgtc tccgccgggt tctcgcagcc gcaacagcag ctgccacaac 420
agcaccacag ccaaccacag gcggtggcgg aggtagctgt cgcagagtcg gtctcggcgc 480
ccgcttctgc ggcgcctcc aatgatggct cgcacacggc ctccatggac ggcggcccca 540
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cgcgcctccg cctgcccac ctctcccca tcatcacctg gaccttcctg ctctcctaca 660
tggccttcat gctcatcatg cccatcacgc cgctgctgca aaaagcctcg ctogtgccgc 720
tcaacgtctt catcgcgcgc gccaccgagc cggtagcgat gcacgcctac tacgtcacct 780
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ccttcacaga cgtggtgctg ccgccgctgc tgcccgogct gctgaccggc acggcactgg 1200
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tcaaggacct gatcgcgccc gtgctgatct tccagtgcct ggagcagtag gactacgtgg 1320
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tgcgagggag cttgtggcgc aggggcaggt ggaggaggtt gcagggtgag gcaggagtgg 1500
caggtggtgg aggtgagcg gcggggtgtt gggatgggat gggatgggac cgtgggaggg 1560
gtgggacttt ggggtgggtg gagtgggtgc tacgtattag gatatgggag gtggtatgca 1620
gttgaagggg ggggtggcaa tctggacggg gactcactgt ttactaggca cgcatgtcgc 1680
aggagtggat atcgatgggt gtggggatgt cagcacgctt ggcttgagtt gggccatggg 1740
accggggact aggcttggtt gcgagccgag ccagtcacca gggagacgta cgagcgca 1800
cagtgattac ggggattgat taggcggcga attgacgcaa atccacgggg gctgtggctt 1860
gggggaggca gggattgagc gaaggacgca ctgcaagctc aggcagtcgc atgcccgtac 1920
cctgcttctg gtccagtgtg gagacaagac tggcaatcgt ggtcctttgc aattcatggc 1980
gcgc

```

(SEQ ID NO: 3)

FIG. 6

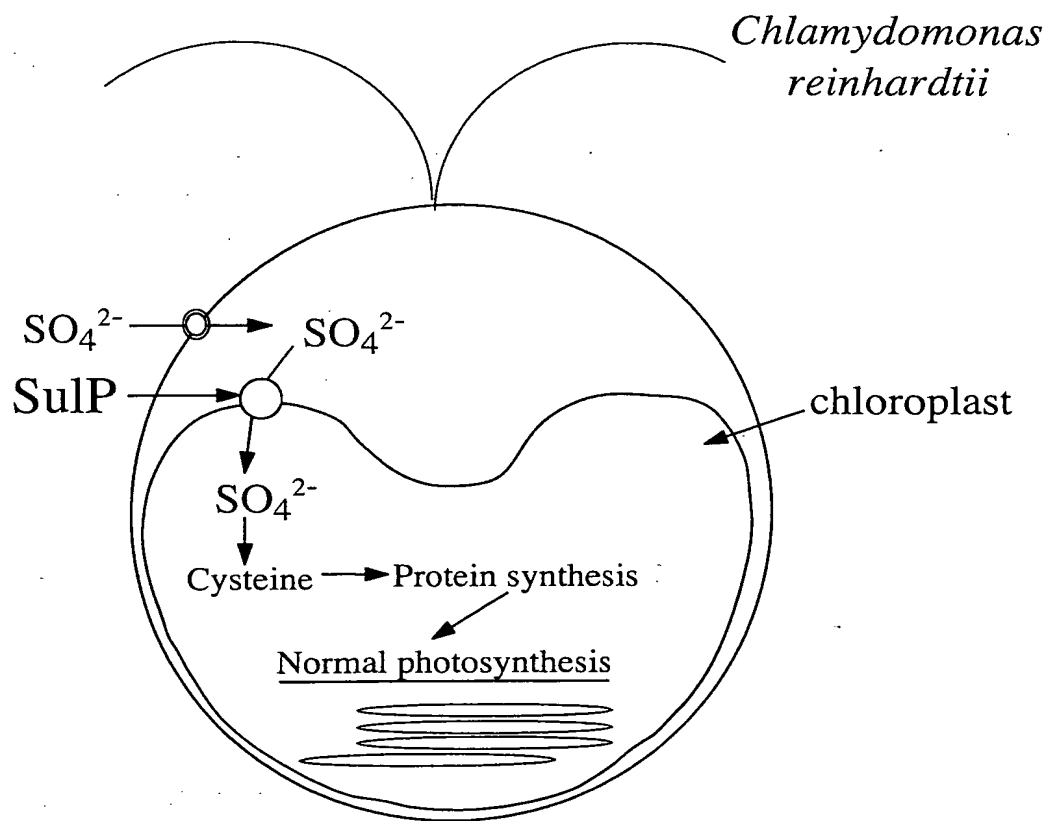


FIG. 7A

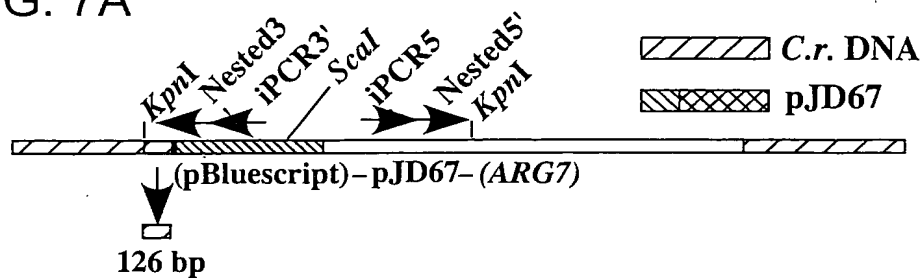
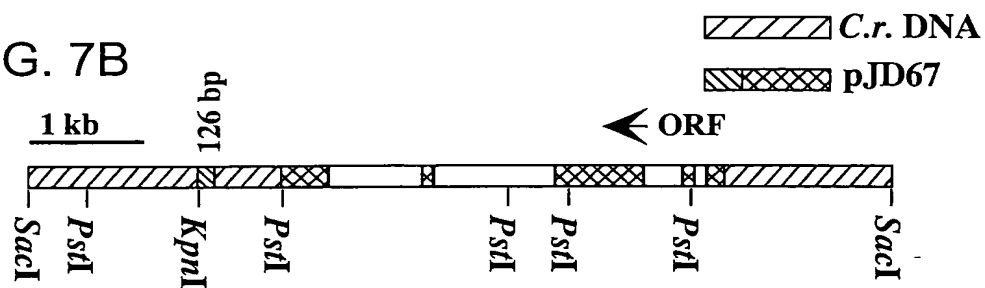


FIG. 7B



[illegible]

Nephroselmis  
Mesostigma  
Chlamydomonas  
Chlorella  
Syn. PCC7942  
Marchantia  
Bacillus

Nephroselmis  
Mesostigma  
Chlamydomonas  
Chlorella  
Syn. PCC7942  
MarCHANTIA  
Bacillus

Nephroselmis  
Mesostigma  
Chlamydomonas  
Chlorella  
Syn.PCC7942  
Marchantia  
Bacillus

IPFQDLIAPVLI FORLEQDYSGATVIGT VVLLI SI TLIIAIINWIOASNRKFLG- 284  
 IPFKDLTAPVLI PQKLEQDYDTGATVIGT VLSISLFIILVGINIIQSLNQMYSK- 269  
 FAFKDLIAPVLI FQCLEQDYVGATVIGT VLLISLVMLAVNQLQKLRK- - - 411  
 LPFKDLVASVLI OSLEQDYDLSVGAVILLI AFTLLINAFQIMKFRV- - - 276  
 LPFDDLIAPVLI FERLEQDYAGATVIGSVLLFSLVILFVINALQNWSSRYNG- 278  
 IPMKDLVISVLLFQKLEQDYKSATIIASFVLI ISFTALFFINKIQLWKKTFFK- 288  
 LPMQTEITPLIMTKLEQDYDYGATATAAVMLIIISFMMILFIFINILQWWSQRRQLS 279

FIG. 8B

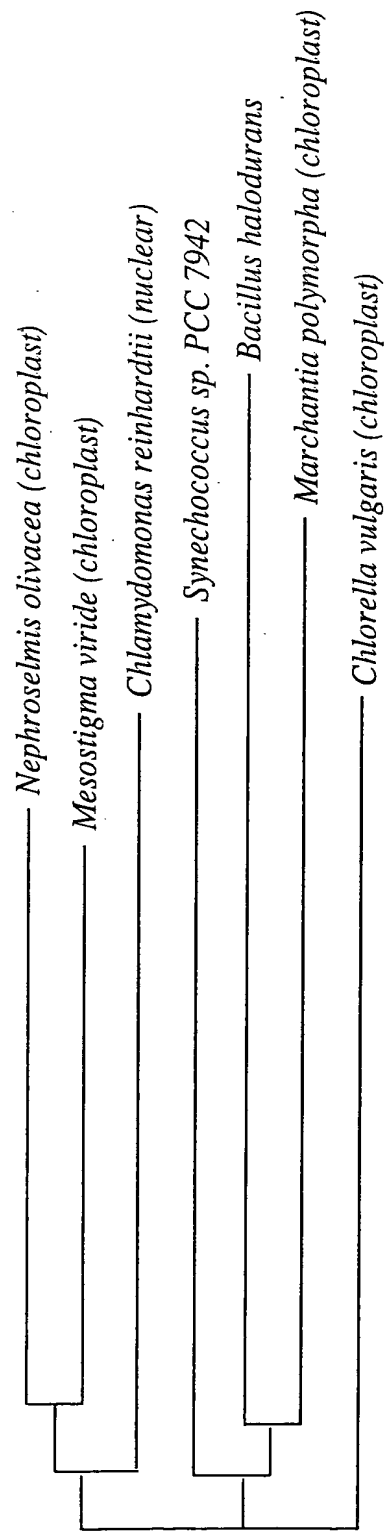


FIG. 9

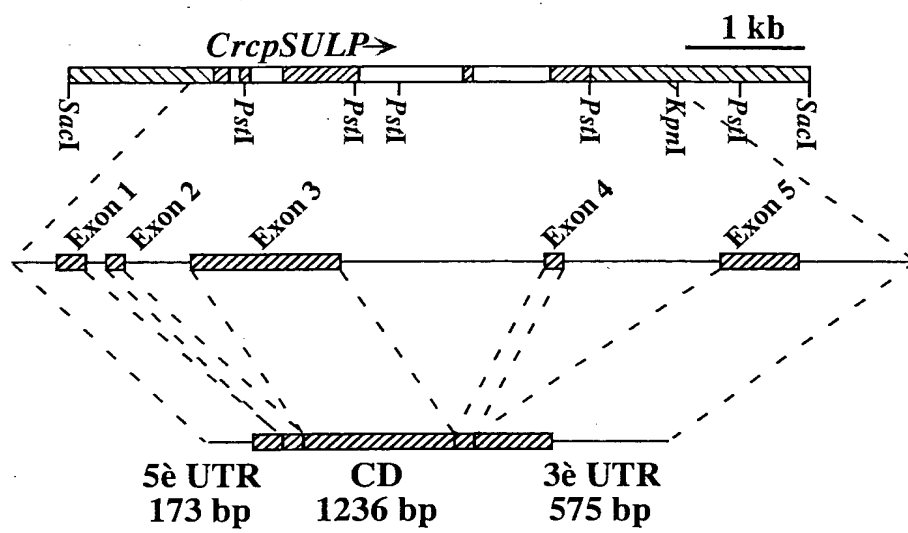


FIG. 10

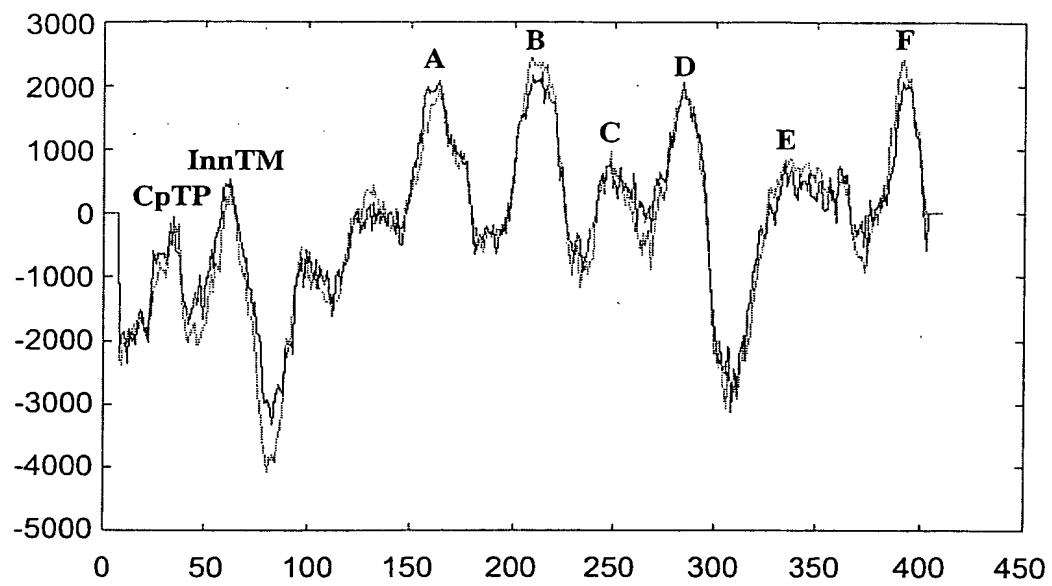


FIG. 11A

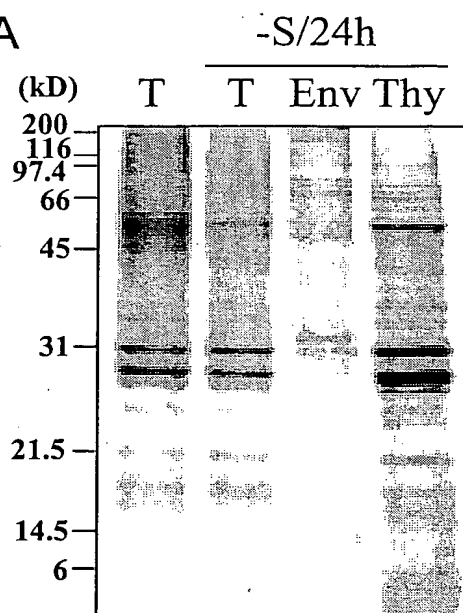


FIG. 11B

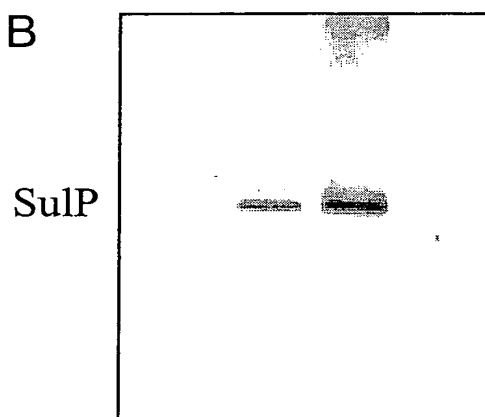


FIG. 12A

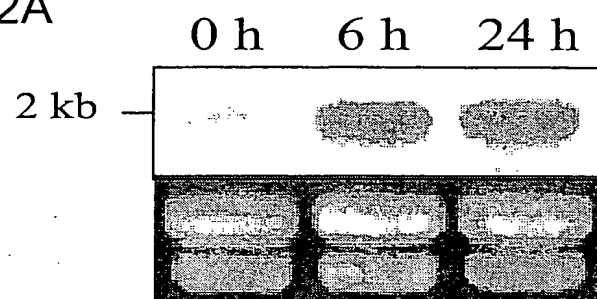


FIG. 12B

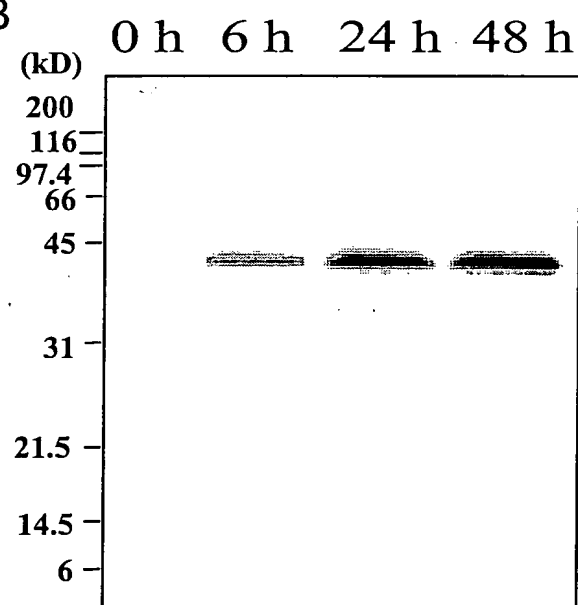


FIG. 13

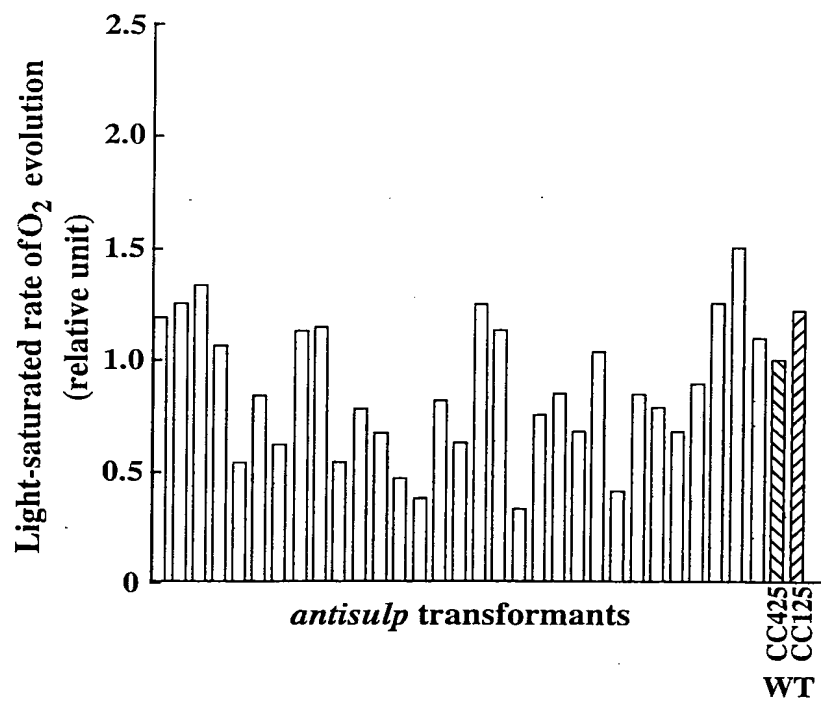


FIG. 14A

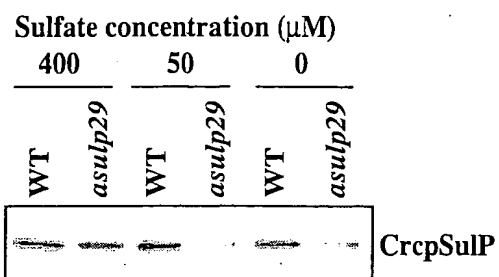


FIG. 14B

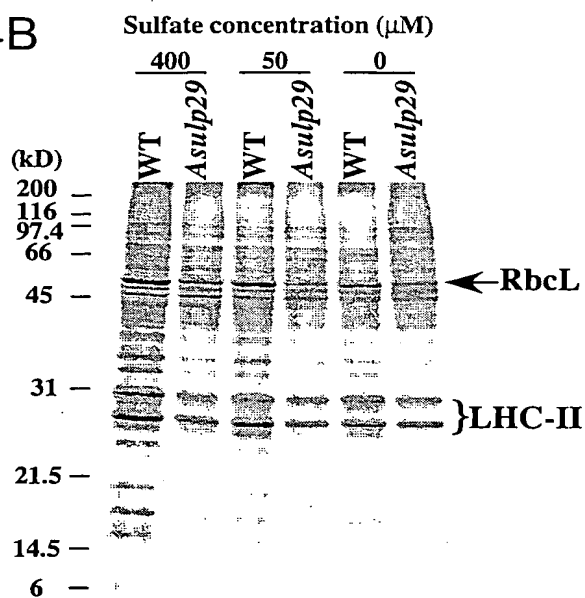


FIG. 14C

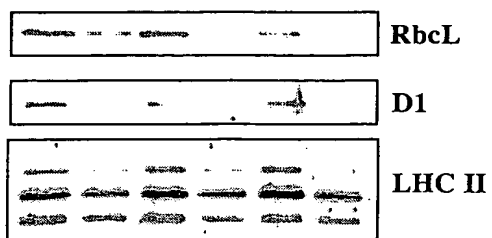


FIG. 15A

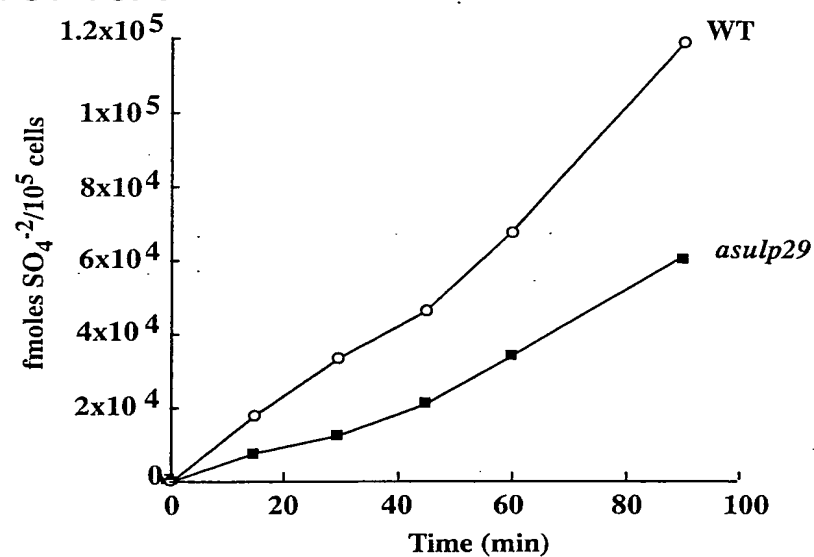
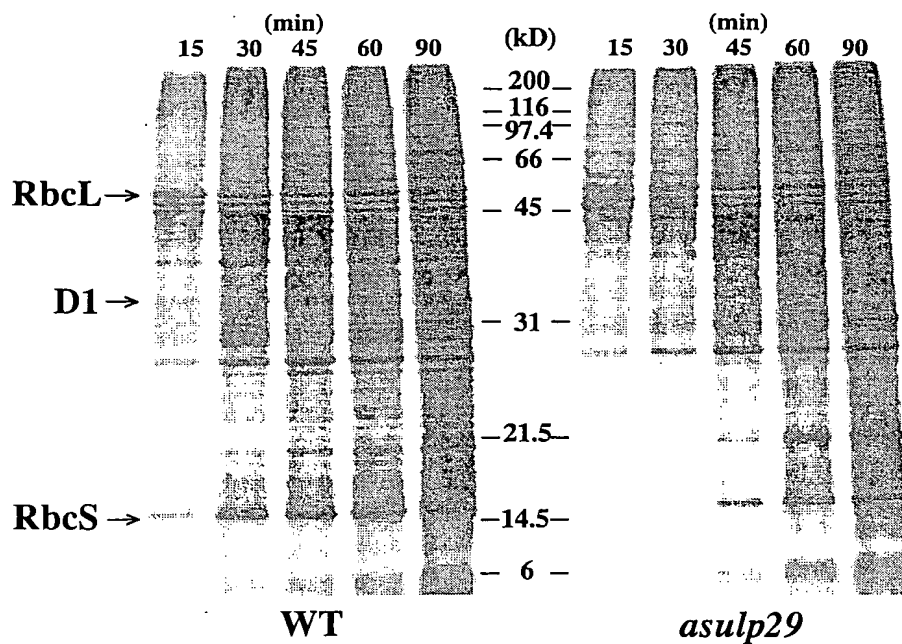
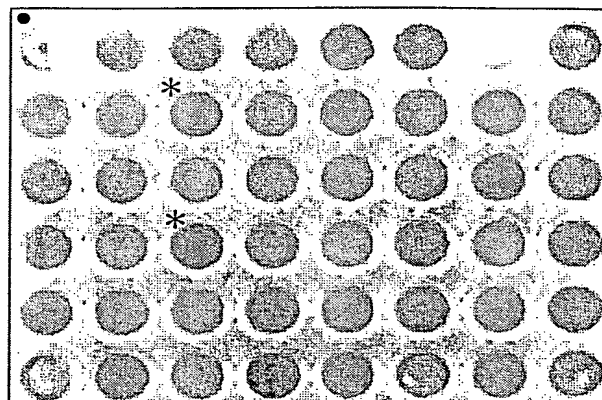


FIG. 15B



400  $\mu\text{M}$  S  
(TAP, S<sub>400</sub>)



150  $\mu\text{M}$  S  
(TAP, S<sub>150</sub>)

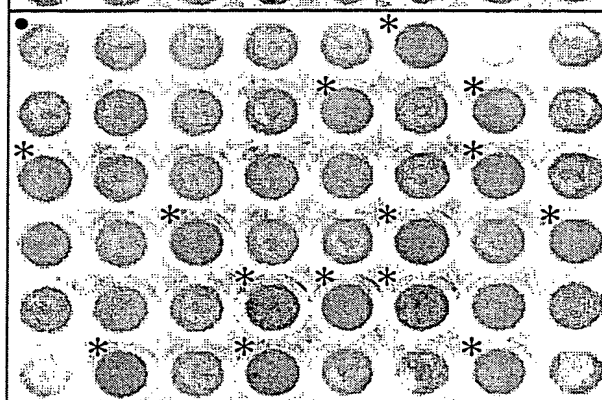


FIG. 16

FIG. 17

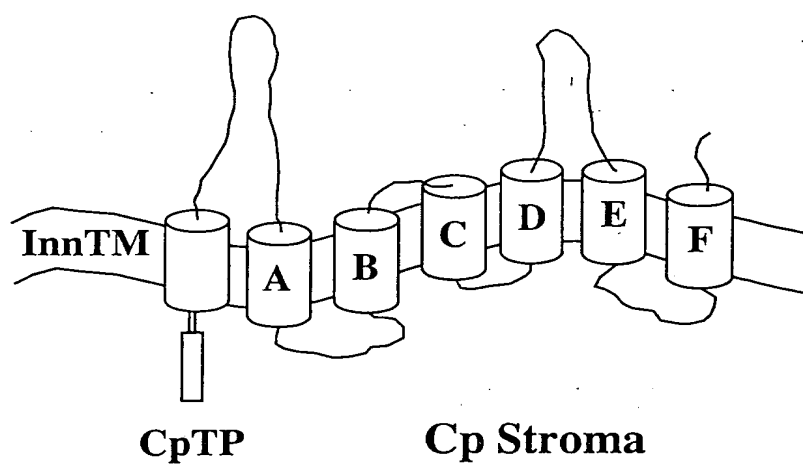


FIG. 18A

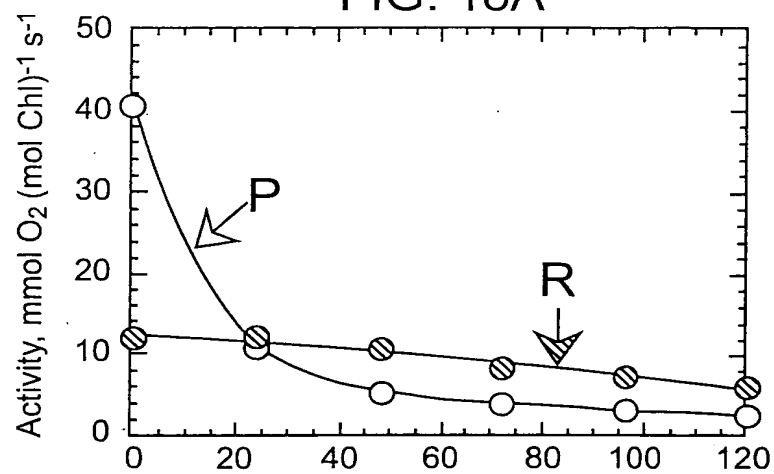


FIG. 18B

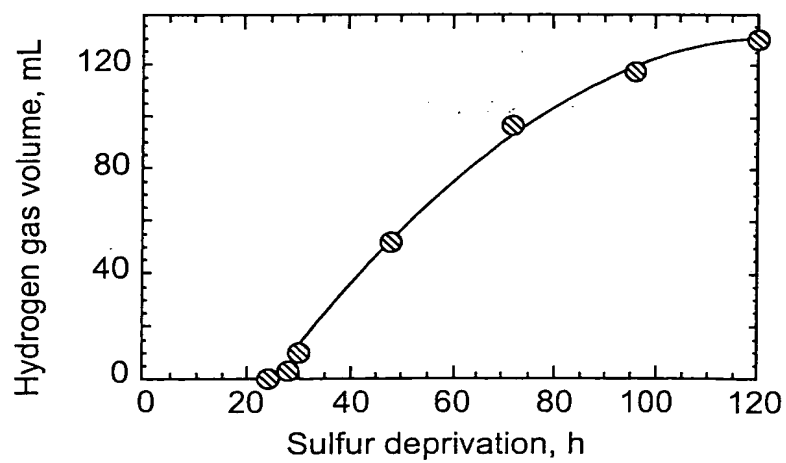


FIG. 19

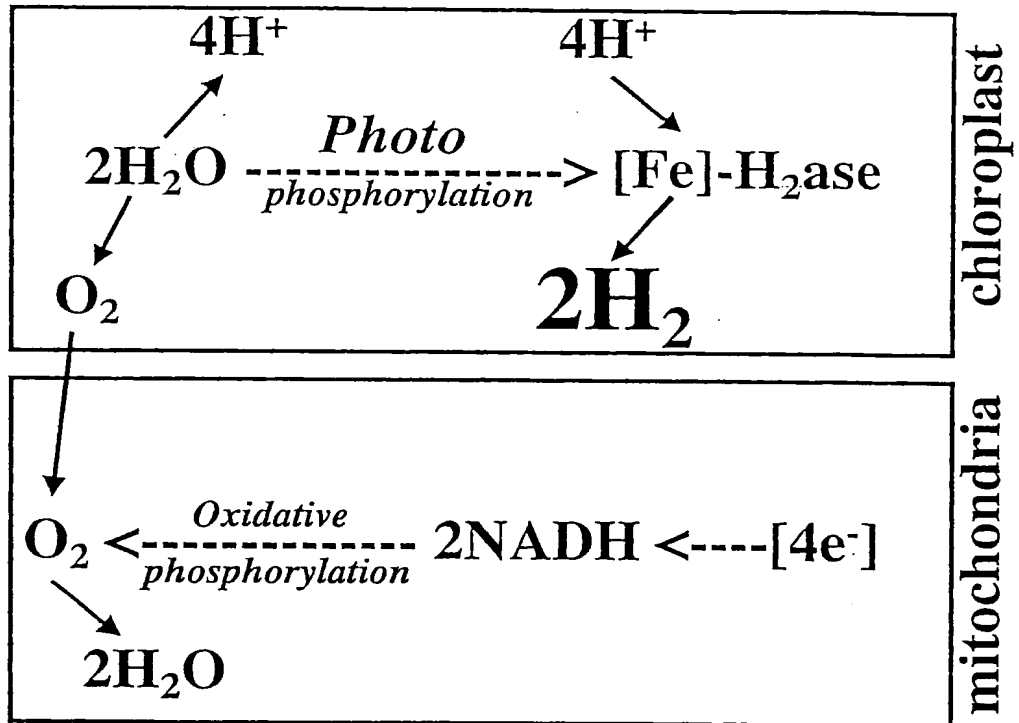
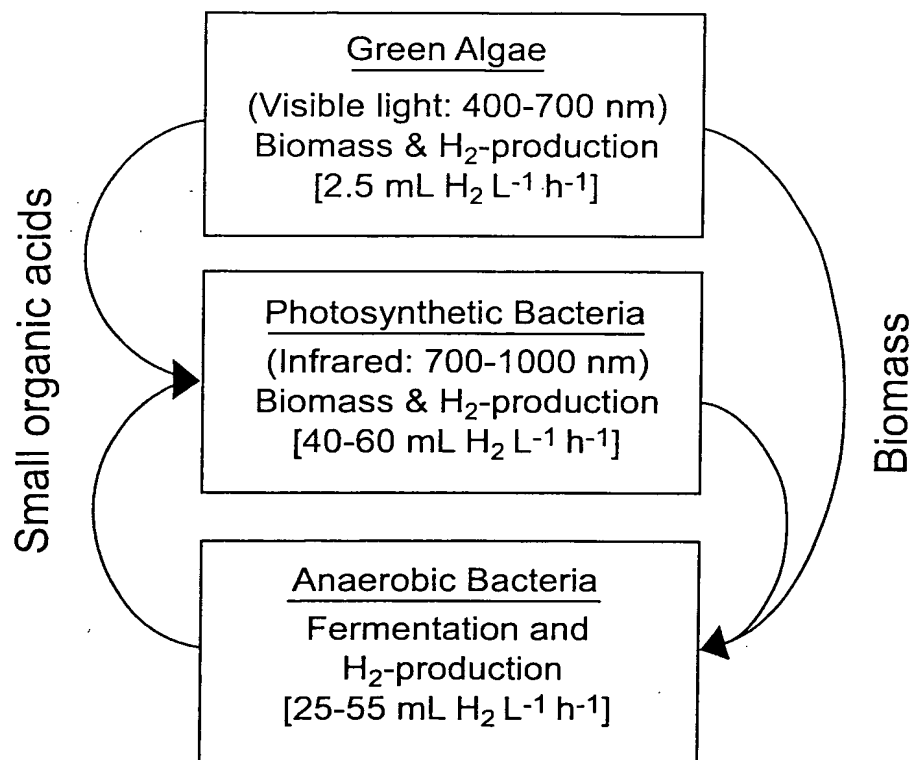


FIG. 20



CATTCAATTGTCAGCGTTCTTAAATGGCAAGCACAAACGCTGCTCCAGCCCGCGCTTGGTCTGCCCTCGCGGGTAGGG  
CCTCGCTCCCTCTGTGCTTCCCAAATTCCTCGCGTGTGCACGCACACTAGTGCTCCCTCTACCTCAAAGTACTGC  
GACTCATCATCAGTTATAGAGAGCACGCTAGGGCGGCAAACATCGGTTGCCGGGAGACCATGGCTTGCACCCCGGCCT  
GCGCCTCAACAAAGCCGAGGCGACCTACTGGTCTCCAAATCGGGGGCAGCAGGAGGCATGGGCGCCCATGGAGGGGGC  
TTAGGGGAACCGGTCGATAATTGGATCAAGAAGCTACTEGTTGGTGTGCGGCGGCGTACATCGGCTTGGTCTGTGCTG  
GTGCCCTTCTGAATGTCTTCGTCCAGGCGTTCGCCAAGGGCATCATTCCCTTCTGGAGCACTGCGCGGACCCGGAC  
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GCGATCAACCTCACGCGCAACGAGTTCCTCGGCAAGGTGTTCTGATGTGCTGCTGGACCTGCCCTTCTCCATCTCG  
CCCGTGGTGACTGGCCTGATGCTCACGCTGCTGTACGGCCGCACCGGCTGGTTCGCGGCGCTGCTGCGGGAGACCGGC  
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GACAAGGTGGAGGAGGCGGCGGCGGAGAGCCGCAAGTAGAGAGGAGCAGGCGGCGTCCGCAGCGGCGGCAGTGGC  
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GGAGGCAGGCGGCGGAGGCGGAGGCGGCGGTGGTGGTGGCTTGGTGGGTGCTTGGTCCGTGGCCAGGGTGCCTGGC  
CTGGGTAGTTGGTGTGTGGGTGAAGCTGATTCTGTTTGGGTGAGGCGGCGGAGTTCCTGAAGGAAGCAAGGAAGGAC  
AGTGCCGCAGTGACCAGCGGGTAATGGTAAGGGAGCTGACACGTGTGGCGTTCTGTTGCTGGTCCGCGCATGCTTAAC  
GCAGCGGAGCAGCTTCTCTGTCTGATGTCTAACGGGGGCGTTGTATGCTGATAATAGACGGAGGGCGAAGGGAGCAG  
GCGCGGTTTCTAGATGGGGTAAAAGCTGTTGGAAATCAACACGTGCAGCGGTTGGGTGTCATTTGTGATCACTGGACGTT  
CTGAGTGGTCCGTGCGCTATAGCGCGTGTGTGCATATATACGCGCGCCGCGCATAAAACATGACTGCATGTGTGCG  
GTGTTGACGGTACAGTTATGCCGTGCCCCGTTTACAAGCGGGATAGAGGCACACTCCACGTAGTATGCATTGAGCCC  
AGTAGACTCTGGTCAGAAGGCCGGTAAATTTACATGTGTGCTGGTGAACCTGTAAGTCATGGCCCAAG  
(SEQ ID NO: 04)

FIG. 21

GTACTTCAATTGTCAGAAATGGCGTCGCTGCTCGCTCAAACAACATCGCGCCTTGGCGCTCGCCCAGCTGCGCAA  
GCTGGCCCTGTGCGCCAAATGGCACCGATGGCAAGCCGAGTGCAGCCGGCGATGCCTAGCGCGCTGCTCCCACT  
GCACGCCAGAGCGACAACAACCTTCAGTCGCTTGCCGGGCAGCCAGCATCGACAAACCTGTCGTTTACACTCCTC  
GAGATTCGTGCAACAGTCCTCCAATGGGGCAGGAGAAGTGTCCATGTCCATATCATCCATGGACGAGGTTGGA  
CCCTCTTATGAGGGAATCATTACAGACGCGCCTACACGACCAACGGGGCTTTATGTGCGGGTGCGCAACATGGT  
GAAGCACTTCAGCACCGCCAAAGGCCTGTTTCAGGGCGGTGGACGGCGTGGACGTGGACATCGAGCCCAGCTCCA  
TCGTGGCGCTGCTGGGGGCCAGCGGCAGCGGCAAGACCACATTGCTGCGCCTCATTGCAGGCCTGGAGCAGCCC  
ACGGGCGGCAACATCTACTTTGACGACACGGACGCGACCAACCTGTCCGTCCAGGACCGCCAGATCGGCTTCGT  
GTTCCAGAGCTATGCGCTGTTCAACCACAAGACAGTTGCGGAGAACATCAAGTTTGGACTGGAGGTGCGCAAGC  
TCAACATCGACCACGACAAGCGCGTGGCGGAGCTGCTGGCGCTGGTGCAGCTCACCGGCCTGGGCGACCGCTAC  
CCGCGCCAACCTGTGCGGCGGCCAGCGGCAGCGTGTGGCGCTGGCGCGCGCCTGGCCTCCAACCCGCGGCTGCT  
GCTGCTGGACGAGCCCTTTGGCGCGCTGGACGCGGTGGTGCGAAGCAGCTGCGCACGGGGCTGCGCGAGATCG  
TGCGCAGCGTGGGCGTGACCACCATCATTGTGACGCACGACCAGGAGGAGGCGTTGCACTGGCGGACAAGGTG  
GTGGTGTTC AACAGGGGCGCTGGTGGAGCAGCAGGGCAGCCCCACCGAGATCATCAAGCGGCCGCGCACGCCCCTT  
CATTATGAAGTTCGTGGGCGAGACCAACGTGGTGCCGGCCACGTGCGCTGCTGGCCAAGCGCATGCGCTTCAACA  
CCTCCAAGACCAGCGTCATGTTCCGGCCGACGACATTAAGCTGTTCAAGACGGTGCCGCCGAGAGCGGCGAG  
GGCGCGCTGACCACGGTGGGCGCCAACGTGGCGGACAAAGCCAACCTGGGCTGGGTGGTCAAGTACACGCTGCG  
CTTCGATGACGACGTGGAGTGCGAGCTGCAGCTCAGCCGCGACAGGACGAGCGCGAGTACAACCTGGTGGTGG  
GCAGCCGCGTGTTCGTGCAAGTGCAGTCCCGCACCGCACCATGATGGGCTTCAACGCCAGCGACGTGGACAGCACGCCC  
ATCGTGTAATGTGCGGGGTGGCGGGCTGTGGCCAGCGATTGTTGCAATGCAGTCCAGCGTGCTCTTGGTTTGGT  
TCCAGTGACACCCATCCAGGGCACAGGTCCTGAGCAGCGGGTGTGGTGTGATGGGTTGGAGCAGTTGTACCCGA  
TTCTCGCATGCAAGGGGGCGGGCGCCACGGGGTGGGAGAGCGGAATGGCGGTGAGGTGGGCTACTGCATGCG  
GCCGTGGAGGAACGGAGGGGTGCACAGGCGGGCAGGTAGACAGGCGGAGCGGGCTGGGTGAGCGGGGCTGTAGT  
TTGGGGGTGGAGGCCGTGCAGACTGGTTGGGATACTGACAGATCAATGAGCGGCGTCTGCTCCATGGGTGAGTA  
GGAGAGCGGTGTGGGTGTGTGCAGTTGCGAGTTCTGGAGCGTTGTGCGCCTCGCGCTGTGTGCGCGCGCCCGTG  
CGTCTGCGGGCGCTGTGCGAGACGGGCGATGTACATGAAGCTGGACCTGGGCCTGTCTCACAAATATCCCTTAT  
GTTAATAGTAGGATGTGCAATCGTGCCCTTGGAGCCACCTGATGTGTGTGTGCACAGGTGGCAGTAGTTTGGCC  
TTGCGGGAGGTAGCACGTCTTTCATGAGAGTGCCTGTGCGTGACCGCTTTTACATTGCCAATCACGCTGGAAGG  
TGAAACCATGCATCATGCGTGCTATCAGGAGATGCAGACGGCGGATTGCTGCCAAAATGTTCTGTTGTTGGTGT  
GCAGACTTGGTGGCGAAGGGGCCAGGCGCCAGGGGTATGCTGCGTGCCAAAGGAGCTGCTGCCGCCACGAGTGA  
CCAGCGAAACTTGTAATTTGAATATTGTATCCT (SEQ ID NO: 05)

FIG. 22

GGGCAGCGTATAAGTAATGTCGTTCTTGGCTCCAGCTTAGGCGTCGCGCGGGGGATTCTGGAGCCGGCGAGTGC  
AGCGAGGCCCGCTGCGCACGCGGCCGGTCACGCACCCGTTCTAACAAGCGATAGGACTGGTGGACCTGCCGCTAA  
TCATGACAGGCCTGCCGGTGCTCCCAGCCCCCATGCGGCGTTCGTTGACGCCCTCCAGCAGCGGGCAAGCAAGCCA  
GCAAGGCGACCCCCAGCGCTCGCAGCACCAGCAAGCGCAGCGCCAGGACCAGCAGCAGTCGCAGTCGCGGTCGCT  
CCAATCACACCTCATCACCGCGGCCACGCTGCTGCCAGCCCTGCCGCTCCGCTCCCGGCGGCAACGGCGACGG  
CGATGGCGGCGAAGCTGCGGGGCCGAGCCGCTCGCGGACGTGCGGGCTCAGCCGCCGAGGTTGTGCTGACGCT  
GGCGTCGTTGCGGGTGACCAAGCTGGCGTACGTGCGTGTGACGCGCGCTTCGGGAGTGGTACGAGCGCACGAA  
GGGCGTGATGTGCGCTTCCGCTCACCTTCGCCGCCAGTGGCGTGCAGGCCCGCGCCGTGATCGATGGCCTGCC  
CGCCGACATCGTGGCCCTGGCGCTGCCTCTGGACCTGGACAAGATCGTGTGCGCGGGGCTGATCCGGCCCCGACTG  
GCGCAGCGCCTACCCGGCAGCCAGCGTGGTGTGCGAGACCACCGTGGCGTTTCGTGGTGCGCCAGGGCAACCCAA  
GAACATCCGCACCTGGGAGGACCTCACCGGGCGGGTGTGGAGGTGGTGTGGCCAACCCCAAGACCGCCGGAGT  
GGCCAGGTGGATCTTCTTGGCCCTGTGGGGCGCCAAGATGAAGAAGGGCAACGCCGCCGCGCTGGCGTATGTGCA  
GCGCGTGTTGAGAACGTGGTGGTGACGCCGCTGATGCGCGCAGGCGTCGGACGTGTTCTATAAGCAGAAGGT  
GGGCGACGTGCTGTTGACGTACGAGAACGAGGTGATCCTGACCAACGAGGTGTACGGCGACAAGGCGCTGCCGTA  
CCTGGTGCCCTCTACAAATCCGCATCGAGTGCCCGCTGGCGCTGGTGGACAAGGTGGTGGATGCCCGCGGGCC  
CGAGGTGCGCGAGGCGGCGTCCGAGTTCTGCCGTTTCTGTTCACGCCCGCGGCGCAGCACGAGTTCGCGCGGCT  
GGGCTTCCGCGTGAACCCGCGCACCTGCAAGGAGGTGGCGGCGCAGCAGACCGGACTGCCGCCCGCAAACCTGTG  
GCAGGTGGACAAGGAGCTGGGCGGCTGGGCTGCGGCCAGAAAGTTTTTCGACGCTGGCGCCATCCTTGACGA  
CATCCAGTCCGCCGTGGGCAAGCTGCGTGTGGAGCAGCGCAAGGCGGCGCAGGCGGCGCCAGGCGGTAGAGAGA  
CGCGGTACAAGTGCTCGGGTGCTCAGCAGGAGCTGCAGCAGGGGCGCAAGAGGGCCTTGACAGGAGGGAATGGT  
AGGCAAAGGCGGCAGGGGAGGCGGGATGGCGGGATGAAGTGAGGGTGTGCAAGCAGCGATGTGTGCCAAGGACGG  
TGTCGGCGATGTACATGATAACATGAGGAGACAGGAGCATCTCTGGCAGGAGGCGGCAACCGTGGAGTGTCTGA  
AAGGAGAACTTGATTGCTCAGTGTGGGACAGATAACGGAGGGCGGGTGTGGGCGTGGGGCTTATCGGTGTGCT  
TCTATGGGAGGCCTGACTGCATTGGGGGCGACGTAGTGTGATGGCCGCTACACGCTTGCTCGGAACTGACATAA  
ACAGGCGTTCAGGCCATGGCTGCATGAGGCTTGATGTCGTATCGCGGACTGTC (SEQ ID NO: 06)

FIG. 23

MASTTLLQPALGLPSRVGPRSPLSLPKIPRVCTHTSAPSTSKYCDSSSVIESTLGRQTSV  
AGRPWLAPRPAPQQSRGDLVSKSGAAGMGAGGGGLGEPVDNWIKKLLVGVAAYIGLV  
VLVPFLNVFVQAFAGIIPFLEHCADPDFLHALKMTLMLAFVTVPLNTVFGTVAAINLTR  
NEFPGKVFLMSLLDLPFSISPVVTGLMLTLLYGRTGWFAALLRETGINVVFAFTGMALAT  
MFVTLPFVVRELIPILENMDLSQEEAARTLGANDWQVFWNVTLPNIRWGLLYGVILCNAR  
AMGEFGAVSVISGNIIGRTQTLTLFVESAYKEYNTEAAFAAAVLLSALALGTLWIKDKVE  
EAAAAESRK\* (SEQ ID NO: 07)

FIG. 24

MASLLAQTT SRLGARPA AQAGPVAQMAPMASRVQPAMPSALLPLHARATTTSVAC  
RAASIDKPVVYTPRDSSQQSSNGAGEVSMSISSMDEVGPSYEGII TDAPTRPTGL  
YVRVRNMVKHFSTAKGLFRAVDGVDVDIEPSSIVALLGPSGSGKTTLLRLIAGLE  
QPTGGNIYFDDT DATNLSVQDRQIGFVFQSYALFNHKTVAENIKFGLEVRKLNID  
HDKRVAELLALVQLTGLGDRYPRQLSGGQRQRVALARALASNPRLLLLDPEFGAL  
DAVVRKQLRTGLREIVRSVGVTIIIVTHDQEEAFDLADKVVVFNRGLVEQQGSPT  
EIIKRPRTPFIMKFVGETNVVPATSLLAKRMRFNTSKTSVMFRPHDIKLFKTVPP  
ESGEGALTTVGANVADKANLGWVVKYTLRFDD DVECELQLSRDQDEREYNLVXGS  
RVFVHVPHRTMMGFNASDVDSTPIV\* (SEQ ID NO: 08)

FIG. 25

MSFLAPSLGVARGILEPASAARPPAHAAGHAPVLTSDRTGGPAANHDRPAGAPSPH  
AASLTPSSSGQASQQGDPQRSQHQAQRQDQQQSQRSLSLQSHLITAATLLPALPPP  
PGGNGDGDGGEAAGPQPLADVAAQPPEVVLTLASFAVTKLAYVRVTRAFREWYE  
RTKGVDVRFRLTFAASGVQARAVIDGLPADIVALALPLDLKIVSAGLIRPDWRSA  
YPAASVVCETTVAFVVRQGNPKNIRTWEDLTRAGVEVVLANPKTAGVARWIFLAL  
WGAKMKKGNAAALAYVQRFENVVQPRDAREASDVFYKQKVGDVLLTYENEV  
ILTNEVYGDKALPYLVPSYNIRIECPLALVDKVVDARGPEVREAASEFCRFLFTPAA  
QHEFARLGFRVNPRTCKEVAAQQTGLPPANLWQVDKELGGWAAAQKKFFDAGAI  
LDDIQSAVGKLRVEQRKAAQAAARR\* (SEQ ID NO: 09)

FIG. 26

FIG. 27

# Chloroplast Sulfate Transport System

